

REMARKS

After entry of this amendment, claims 1, 5-12, 16-30, 34-40, 47, 49, 56, 58, 60, 62, 73 and 76-85, and new claim 86 are pending and rejected.

The specification has been amended to correct an obvious typographical error to correct the accession number from DO0115 to D00115.

Claims 1 and 12 have been amended to recite that the RNA fragments are at least 21 nucleotides in length. Support for this amendment is in the specification on page 42, third paragraph and the article by Voinnet. Claims 1 and 12 are also amended to recite that "said plant cell has resistance or tolerance to said furovirus, potyvirus, tospovirus or cucomovirus. Support is in the specification on page 4, second paragraph, and page 6, third paragraph.

Claim 12 has been amended to delete the phrase "capable of expressing" to "encoding" and that the RNA molecule or molecules form double stranded RNA when expressed in said cell as suggested by the Examiner.

Claims 4, 46, 50, 52, 57 and 60 have been canceled without prejudice.

Claims 5, 16, 77, 78, 79, and 83-85 have been amended to delete the word "derived" and insert therefor "obtained".

Claims 56 and 58 have been amended to delete the word "derived" and replaced with the word "regenerated" as suggested by the Examiner.

Claim 56 has been amended to delete the recitation of "and progeny thereof" and new claim 86 has been added to recite the progeny regenerated from the plant of claim 56 as suggested by the Examiner.

Claims 49, 56, 58, 62, 73 and 76 have been amended to recite that the plants and seeds are virus resistant or tolerant to said furovirus, potyvirus, tospovirus or cucomovirus.

Claims 81 and 82 have been amended to recite wherein the RNA fragment is about 450 nucleotides and where the BNYVV fragment is from nucleotide 5168 to nucleotide 5260. Support for these amendments is in the specification on page 42, lines 26-27. No new matter has been added by these amendments.

Claim Objections

Claims 46 and 52 were objected to as not further limiting the independent claim. Claims 46 and 52 have been canceled without prejudice, thereby making this objection moot.

Section 112, first paragraph, Rejection of Claims 1, 4-12, 16-30, 34-40, 46-47, 49, 50, 52, 56-58, 60-62, and 73 and new claims 76-85

Claims 1, 4-12, 16-30, 34-40, 46-47, 49, 50, 52, 56-58, 60-62, and 73 and new claims 76-85 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In particular, the Office action contends that the sequence of the BNYVV RNA1 was not provided because the database containing the accession no. D00115 is unknown. The Examiner alleges that this is not a Genbank accession no., for example. Further, the office action points out that Voinnet (Trends in Genetics, 2001, 17:449-459) teaches that polynucleotides of 21-23 nts long RNA are formed from the targeted transcript during RNA silencing in virus-infected plant cells (page 451) and that the present specification does not describe any viral genome portions smaller than 21 nts. that can be used with the claimed invention.

Applicants respectfully disagree with this rejection.

The BNYVV RNA1 nucleotide sequence was available to those of ordinary skill in the art who would have known to search the available publications on the BNYVV virus genome sequences that were published by Bouzoubaa et al. J. Gen Virol. 68:615-26 (1987) and submitted to Genbank having accession no. D00115, which was replaced with a newer sequence on Feb. 25, 2002. Copies of the article and seqeybce if accession no. D00115 are provided herewith as Exhibits 1 and 2. Therefore, the nucleotide sequence of the BNYVV virus was available to those of ordinary skill in the art by searching the available databases.

Regarding the lower limit for fragment size to produce RNA silencing, the claim has been amended to recite the lower limit of 21 nucleotides.

Declaration on tospovirus, potyvirus, cucomovirus silencing

The Declaration of Ian Evans under 37 CFR § 1.132 and attached exhibits describes the work conducted as described in the specification to produce plant cells and plants resistant or having improved tolerance to a tospovirus, potyvirus or cucomovirus. Further, the slide presentation by Bucher et al., describes in further detail the role of RNA silencing in reducing Tospovirus infection (Exhibit 3).

Therefore, the description of the specification as filed describes to one skilled in the art that the inventor's had possession of the invention as presently claimed at the time the application was filed. Applicants submit the above amendments and remarks overcome this rejection, and respectfully request its withdrawal.

Section 112, first paragraph, Rejection of Claims 1, 4-12, 16-30, 34-40, 46-47, 49, 50, 52, 56-58, 60-62, and 73

Claims 1, 4-12, 16-30, 34-40, 46-47, 49, 50, 52, 56-58, 60-62, and 73 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The legal standard for enablement was set forth in the prior Response.

The presently claimed invention is directed to methods for conferring resistance or tolerance to a furovirus, tospovirus, potyvirus or cucurmovirus using RNA or DNA sequences from those virus families. The specification as filed describes in Example 9 the use of sequences from a furovirus (BNYVV) for producing plants with resistance to a furovirus. The methods described in the specification can be applied to other viruses and obtain resistant plants.

Regarding viral genomes that expression PTGS suppressors, it is known some viruses have suppressors, such as the PVY, CMV and TSWV. The Declaration of Evans shows that resistance was obtained to the TSWV even though it encodes a suppressor. The Prins group has begun to study the NSs suppressor in the tospovirus, TSWV, on the expression of the marker gene, Green Fluorescent Protein (GFP). See Exhibit 4 for slides of experiments.

Regarding using the fragment of BNYVV between the indicated nucleotides, the viral sequence of BNYVV was known and available to those in the art if they searched the literature or Genbank sequence database as explained above. Accession no. D00115 for BNYVV RNA1 already available to those of ordinary skill in the art who would know to search the publications and available nucleotide sequence databases for BNYVV sequences.

Claims 1 and 12 have been amended to recite RNA fragments at least 21 nucleotides.

Claims 81 and 82 have been amended to recite the correct sequence numbers of the nucleotides used in the examples in the specification. Claim 82 has also been amended to delete the recitation of the word "about." This does not present new matter as the specific nucleotides used in the example were listed in the specification.

The above remarks, and amendments overcome and /or obviate the above grounds for rejection, and Applicants respectfully request its withdrawal.

Claim Rejections under 35 USC § 112, first paragraph

Claims 81 and 82 are rejected under 35 USC § 112, first paragraph, as allegedly failing to comply with the written description requirement for not being described in the specification. In particular, the examiner alleges the specification does not describe when the BNYVV is "about 400 nucleotides" and when it is "about nucleotide 5178 to about 5620."

Claims 81 and 82 have been amended to correct an obvious typographical error and mathematical error, and claim 82 has been amended to remove the recitation of the word "about". Claims 81 and 82 are supported in the specification on page 42, in Example 9, particularly on lines 26-27, wherein the fragment was from 5168-5620 which is 452 nts. The claims as amended do not constitute new matter and should be in form for allowance.

Claim Rejections under 35 USC § 112, second paragraph

Claims 1, 4-12, 16-30, 34-40, 46, 47, 49, 50, 52, 56-58, 60, 62, 73 and 76-85 are rejected under 35 USC § 112, second paragraph, for allegedly being indefinite.

Claims have been amended to more particularly point out and distinctly claim the present invention. These amendments overcome and obviate these rejections, and Applicants respectfully request their withdrawal.

Claims Rejections under 35 USC §103

Claims 1, 4-12, 16-30, 34-40, 46-47, 49, 50, 52, 56-60, 62, 73 and 76-85 are rejected under 35 USC § 103(a) as allegedly being unpatentable over Fire et al. (US Patent No. 6,506,559) in combination with de Haan et al. (J. Gen. Virol. 1991, 71:2207-2216), Maiss et al. (J. Gen. Virol. 1989, 70:513-24), Saito et al. (Arch. Virol. 1996, 141:2163-075), Hsu et al. (Arch. Virol. 1995, 140:1841-47), Miki et al. (Procedures for Introducing Foreign DNA into Plants, In Methods in Plant Molecular Biology and Biotechnology, 1993), Applicants admitted state of the prior art, and Keddie et al. (Plant Mol. Biol. 1994, 24:327-340).

The Office Action contends that it would have been obvious for one of ordinary skill to stably transform a plant cell with DNA construct that comprises DNA encoding sense and antisense RNA fragments following the demonstration of Fire in view of the teaching by the other citations of plant virus sequences, or tissue specific, developmentally regulated, inducible or bi-directional promoters.

Applicants disagree with this rejection.

A finding of obviousness under § 103 requires a determination of the scope and content of the prior art, the level of ordinary skill in the art, the differences between the claimed subject matter and the prior art, and whether the differences are such that the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made. Graham v. Deere, 383 U.S. 1 (1966). The relevant inquiry is whether the prior art suggest the invention, and whether the prior art provides one of ordinary skill in the art with a reasonable expectation of success. In re O'Farrell 853 F.2d 894, 903 (Fed. Cir. 1988). Both the suggestion and the reasonable expectation of success must be founded in the prior art and not in the Applicants' disclosure. In re Vaeck 947 F.2d 488 (Fed. Cir. 1991).

Most important, "obvious to try" a particular experiment or combination is not the appropriate standard for determining obviousness. In re Lindell, 385F.2d 453, 15 U.S.P.Q. 521 (C.C.P.A. 1967).

The cited references do not make obvious the presently claimed invention. Fire et al., describes in the examples of the microinjection of RNA into the nematode, *Caenorhabditis elegans*. Fire merely states in col. 8, lines 12-15 that a "target gene may be derived from or contained in any organism. The organism may [be] a plant, animal, protozoan, bacterium, virus or fungus. The plant may be a monocot, dicot or gymnosperm;" The patent continues by describing types of plants on col. 8, lines 20-34.

Fire fails to provide any reasonable expectation of success of using double stranded RNA synthesized from a DNA construct, and Fire fails to provide any working example of such a plant. Therefore, Fire does not provide a teaching of the present invention or any reasonable expectation of success.

Further, the additional references, cited alone or in combination with Fire, do not provide any reasonable expectation of success of the present invention, and do not make obvious the present invention.

The above remarks overcome this rejection and Applicants request its withdrawal.

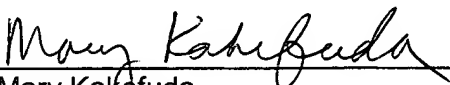
CONCLUSION

The above amendments and remarks overcome or obviate the above rejections and put the application in form for allowance.

The Commissioner is hereby authorized to charge any additional fees under 37 CFR §1.17 which may be required, or credit any overpayment, to Account No. 50-1744 in the name of Syngenta.

Respectfully submitted,

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